

ABSTRACT

A semiconductor optical amplifier (SOA) has an overall gain that is substantially polarization independent, i.e., less than 1 dB difference between transverse electric (TE) and transverse magnetic (TM) gain. The SOA includes a residual cladding layer having different thicknesses over different portions of the gain section. Over a first portion of the gain section, the residual cladding layer is thinner than over a second portion of the gain section. This results in the first portion providing more gain to optical energy having a TE polarization state than optical energy having a TM polarization state. In the second portion of the gain section, however, more gain is provided to optical energy having a TM polarization state than energy having a TE polarization state. The resulting gain differences can be designed to offset one another so that the output has a gain that is substantially polarization independent.